



BFL4004

N-Channel Power MOSFET 800V, 6.5A, 2.5Ω, TO-220F-3FS

ON Semiconductor®

<http://onsemi.com>

Features

- ON-resistance $R_{DS(on)}=1.9\Omega$ (typ.)
- Input capacitance $C_{iss}=710pF$ (typ.)
- 10V drive

Specifications

Absolute Maximum Ratings at $T_a=25^\circ C$

| Parameter | Symbol | Conditions | Ratings | Unit |
|------------------------------------|------------------|---|-------------|------------|
| Drain-to-Source Voltage | V_{DSS} | | 800 | V |
| Gate-to-Source Voltage | V_{GSS} | | ± 30 | V |
| Drain Current (DC) | I_{DC}^{*1} | Limited only by maximum temperature $T_{ch}=150^\circ C$ | 6.5 | A |
| | I_{Dpack}^{*2} | $T_c=25^\circ C$ (Our ideal heat dissipation condition)*3 | 4.3 | A |
| Drain Current (Pulse) | I_{DP} | $PW \leq 10\mu s$, duty cycles $\leq 1\%$ | 13 | A |
| Allowable Power Dissipation | P_D | | 2.0 | W |
| | | $T_c=25^\circ C$ (Our ideal heat dissipation condition)*3 | 36 | W |
| Channel Temperature | T_{ch} | | 150 | $^\circ C$ |
| Storage Temperature | T_{stg} | | -55 to +150 | $^\circ C$ |
| Avalanche Energy (Single Pulse) *4 | E_{AS} | | 225 | mJ |
| Avalanche Current *5 | I_{AV} | | 6.5 | A |

Note : *1 Shows chip capability

*2 Package limited

*3 Our condition is radiation from backside.

The method is applying silicone grease to the backside of the device and attaching the device to water-cooled radiator made of aluminium.

*4 $V_{DD}=50V$, $L=10mH$, $I_{AV}=6.5A$ (Fig.1)

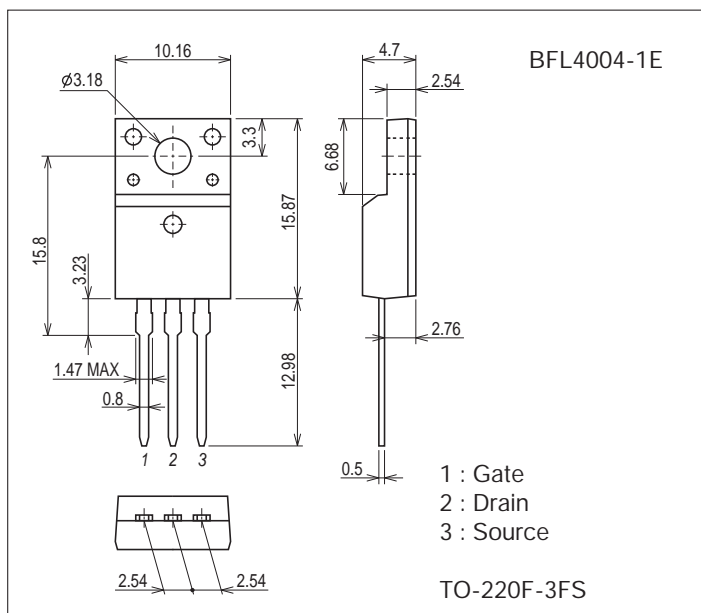
*5 $L \leq 10mH$, single pulse

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Package Dimensions

unit : mm (typ)

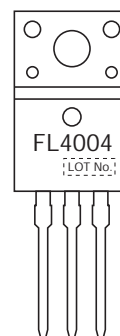
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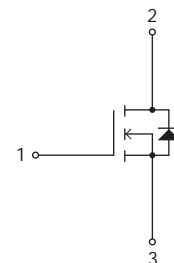
Product & Package Information

- Package : TO-220F-3FS
- JEITA, JEDEC : SC-67
- Minimum Packing Quantity : 50 pcs./tube

Marking



Electrical Connection



BFL4004

Electrical Characteristics at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|--|---------------|---|-----------------------|------|-----------|----------|
| | | | min | typ | max | |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D=10mA, V_{GS}=0V$ | 800 | | | V |
| Zero-Gate Voltage Drain Current | I_{DSS} | $V_{DS}=640V, V_{GS}=0V$ | | | 1.0 | mA |
| Gate-to-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 30V, V_{DS}=0V$ | | | ± 100 | nA |
| Cutoff Voltage | $V_{GS(off)}$ | $V_{DS}=10V, I_D=1mA$ | 2.0 | | 4.0 | V |
| Forward Transfer Admittance | $ y_{fs} $ | $V_{DS}=20V, I_D=3.25A$ | 1.7 | 3.4 | | S |
| Static Drain-to-Source On-State Resistance | $R_{DS(on)}$ | $I_D=3.25A, V_{GS}=10V$ | | 1.9 | 2.5 | Ω |
| Input Capacitance | C_{iss} | $V_{DS}=30V, f=1MHz$ | | 710 | | pF |
| Output Capacitance | C_{oss} | | | 120 | | pF |
| Reverse Transfer Capacitance | C_{rss} | | | 42 | | pF |
| Turn-ON Delay Time | $t_{d(on)}$ | | See Fig.2 | | 17 | |
| Rise Time | t_r | | | 44 | | ns |
| Turn-OFF Delay Time | $t_{d(off)}$ | | | 130 | | ns |
| Fall Time | t_f | | | 44 | | ns |
| Total Gate Charge | Q_g | $V_{DS}=200V, V_{GS}=10V, I_D=6.5A$ | | 36 | | nC |
| Gate-to-Source Charge | Q_{gs} | | | 6.2 | | nC |
| Gate-to-Drain "Miller" Charge | Q_{gd} | | | 18 | | nC |
| Diode Forward Voltage | V_{SD} | | $I_S=6.5A, V_{GS}=0V$ | | 0.85 | 1.2 |
| Reverse Recovery Time | t_{rr} | See Fig.3 | | 970 | | ns |
| Reverse Recovery Charge | Q_{rr} | $I_S=6.5A, V_{GS}=0V, di/dt=100A/\mu s$ | | 6700 | | nC |

Fig.1 Unclamped Inductive Switching Test Circuit

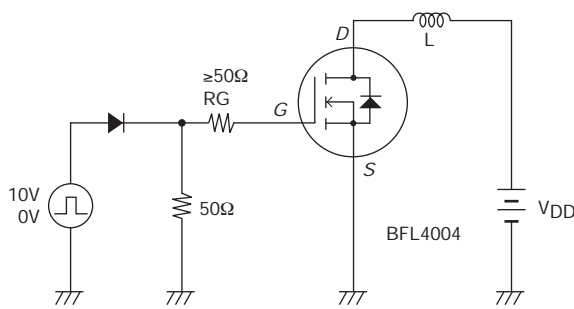


Fig.2 Switching Time Test Circuit

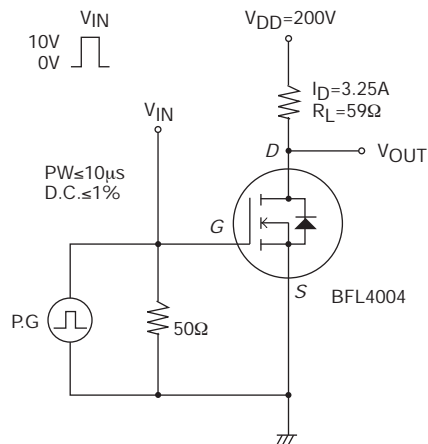
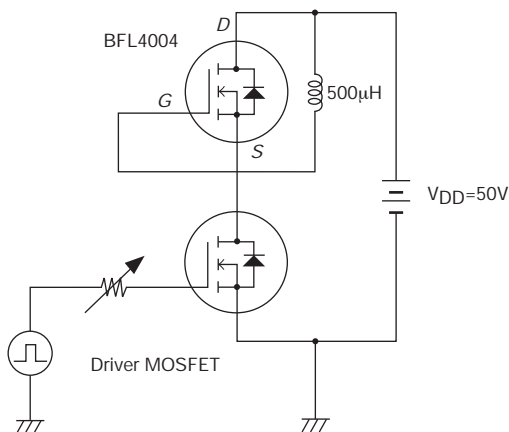
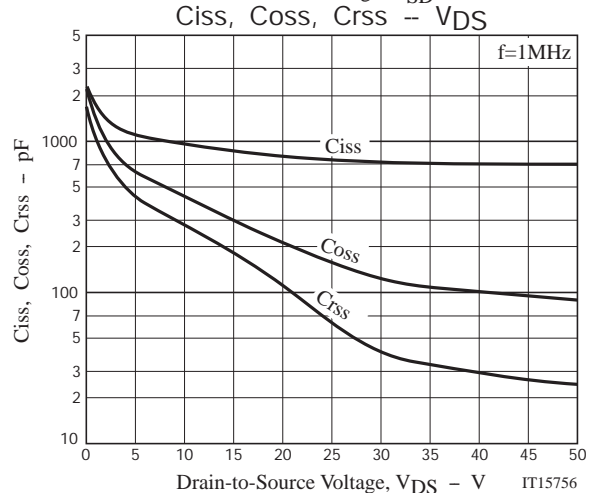
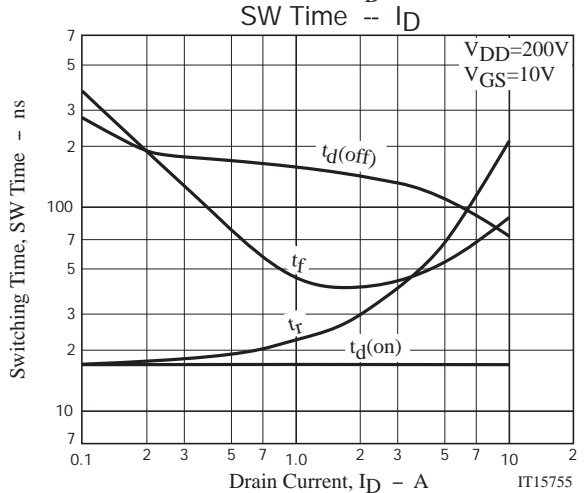
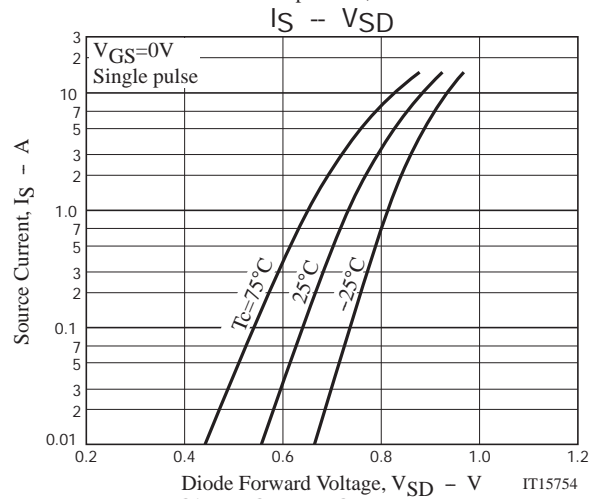
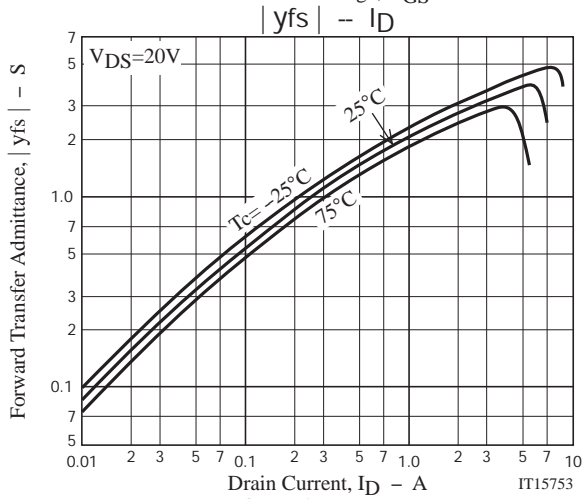
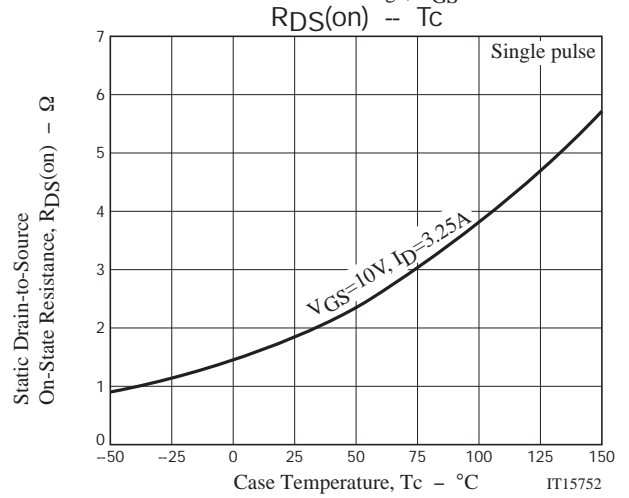
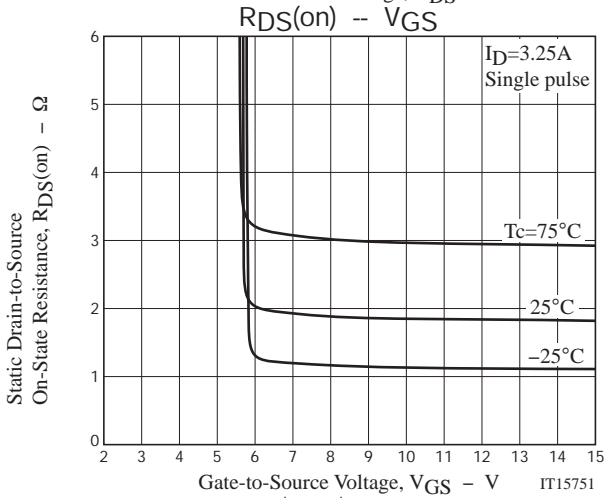
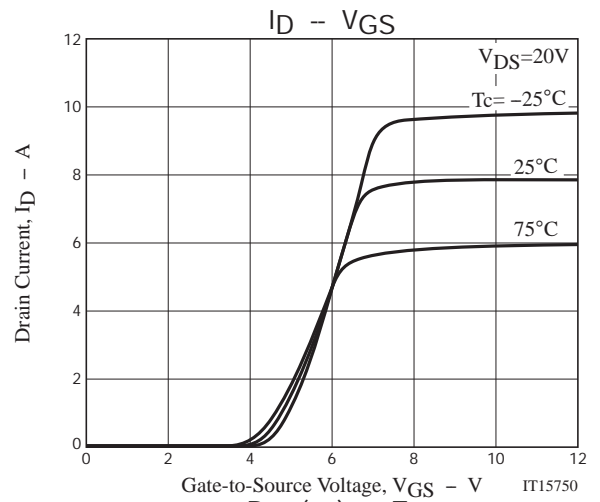
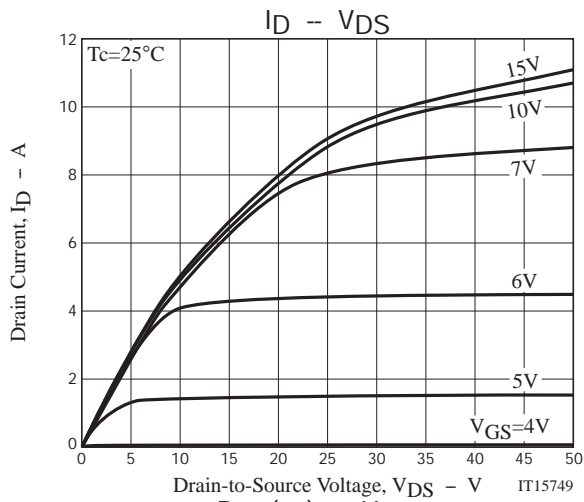


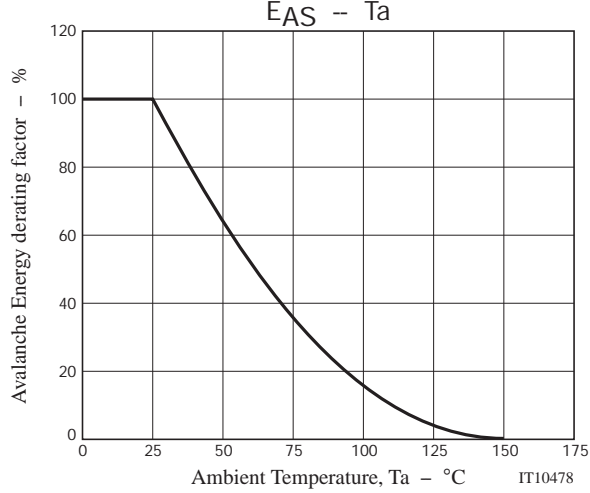
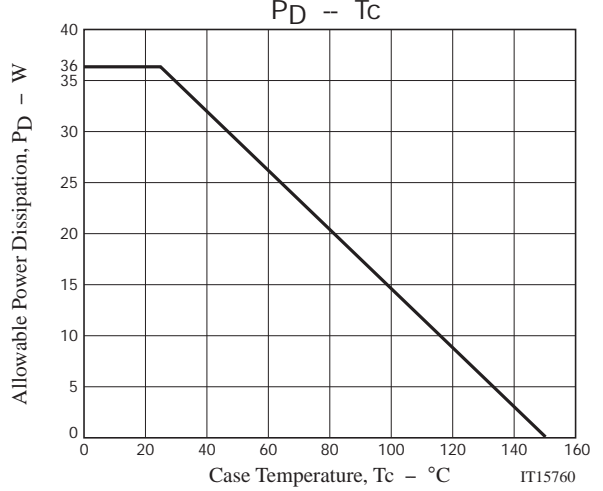
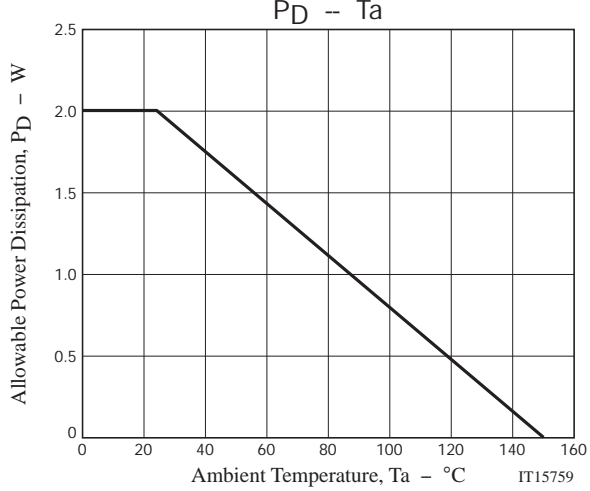
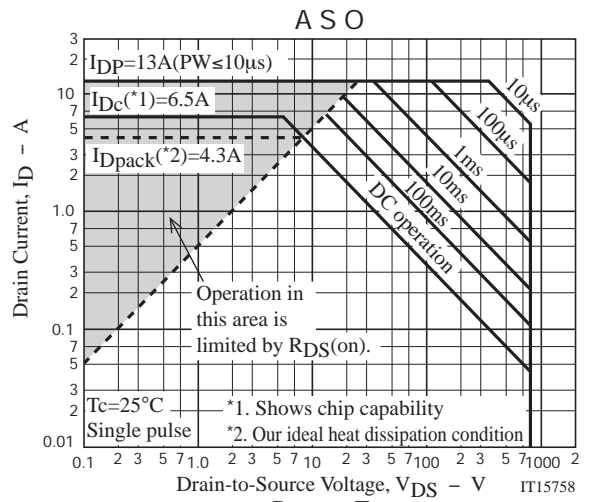
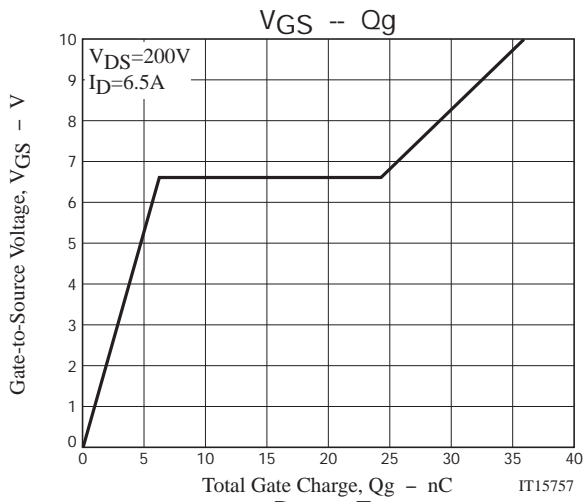
Fig.3 Reverse Recovery Time Test Circuit



Ordering Information

| Device | Package | Shipping | memo |
|------------|-------------|-------------|---------|
| BFL4004-1E | TO-220F-3FS | 50pcs./tube | Pb Free |





Magazine Specification

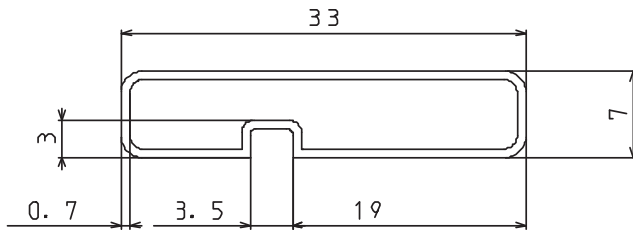
BFL4004-1E

1. Packing Format

| Package Name | Magazine Name | Maximum Number of devices contained (pcs) | | | Packing format | |
|--------------|---------------|---|-----------|-----------|--|--|
| | | Magazine | Inner box | Outer box | Inner BOX | Outer BOX |
| TO-220F-3FS | TO-220F | 50 | 1,000 | 4,000 | SPD-0V0001 20 magazines contained Dimensions:mm (external) 568×150×55 | SPT-081029 4 inner boxes contained Dimensions:mm (external) 590×225×178 |

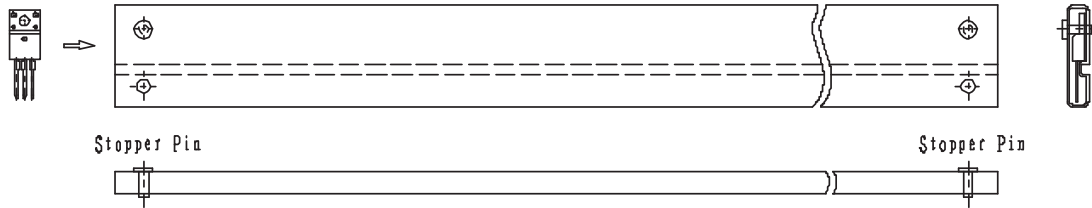
2. Magazine dimensions

(unit:mm)

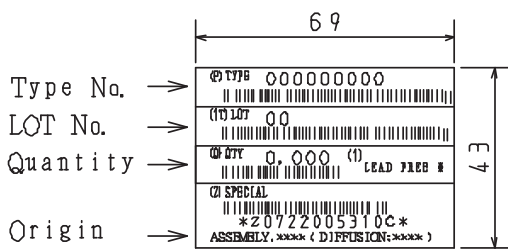


Tolerance=±0.3mm
 Thickness=0.7±0.2mm
 Length =532.5±2mm
 Material =PVC (Antistatic treatment)

3. Storage method to magazine

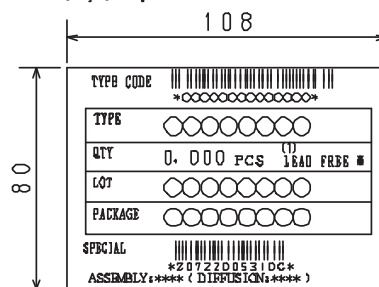


4. Inner box label (unit:mm)



5. Outer box label (unit:mm)

It is a label at the time of factory shipments.
 The form of a label may change in physical
 distribution process.



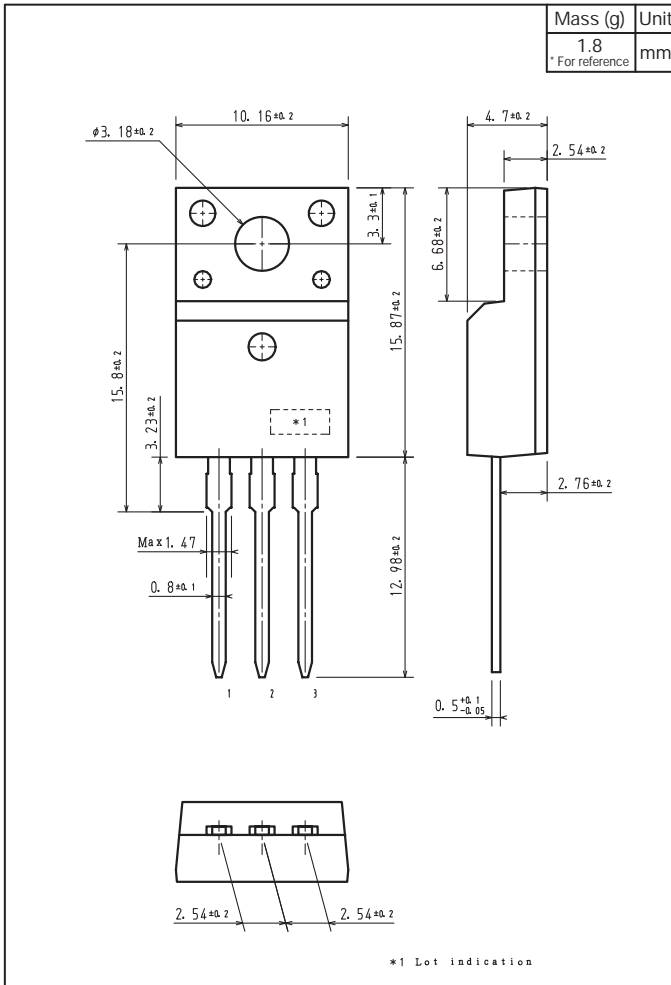
NOTE (1)

The LEAD FREE * description shows that the surface treatment of the terminal is lead free.

| Label | JEITA Phase |
|-------------|----------------|
| LEAD FREE 3 | JEITA Phase 3A |

Outline Drawing

BFL4004-1E



Note on usage : Since the BFL4004 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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